(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) EP 0 556 460 B1

(12) EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention of the grant of the patent:
25.09.1996 Bulletin 1996/39

(51) Int. Cl.[6]: **B41F 35/04**, B41F 31/02

(21) Application number: **92120088.7**

(22) Date of filing: **25.11.1992**

(54) Printing apparatus and method

Druckapparat und Verfahren

Appareil d'impression et procédé

(84) Designated Contracting States:
DE GB IT

(30) Priority: **18.02.1992 US 837823**

(43) Date of publication of application:
25.08.1993 Bulletin 1993/34

(73) Proprietor: **Paper Converting Machine Company**
Green Bay, Wisconsin 54307-9005 (US)

(72) Inventor: **Schaeuble, Edwin K.**
Green Bay, Wisconsin 54311 (US)

(74) Representative: **Ruschke, Hans Edvard, Dipl.-Ing. et al**
Patentanwälte
Ruschke & Partner
Pienzenauerstrasse 2
81679 München (DE)

(56) References cited:
EP-A- 0 277 481
EP-A- 0 382 347
EP-A- 0 390 771
EP-A- 0 468 655
DE-B- 1 140 205

EP 0 556 460 B1

Printed by Rank Xerox (UK) Business Services
2.13.4/3.4

Description

BACKGROUND AND SUMMARY OF INVENTION:

This invention relates to a printing apparatus and method and, more particularly, to a fountain-providing turret which facilitates both doctor blade and applied liquid changeover.

One of the advantageous uses of the invention is in connection with flexographic presses. One of the largest costs in the flexographic printing industry is the time required to change the press from one job to the next. This changeover process typically involves: (1) draining the ink from the doctor blade/fountain assembly, (2) wiping the anilox roll clean, (3) cleaning or removing the doctor blade holder, (4) installing new doctor blades, (5) replacing the plate roll (new job) and (6) filling system with new ink. These steps can take up to one hour per press deck.

Historically, several systems for shortening these change times have been tried, however, none of the automatic washup systems currently employed provide a complete cleaning of the doctor blade holder. Moreover, the problem of doctor blade change time has not been addressed.

Prior publication DE-B-1 140 205 discloses a method of operating a printing press or the like having a frame rotatably supporting a fluid transfer roll, providing a turret indexably, translatably mounted on the frame and having an indexing axis and which is provided with assemblies for supplying fluid to the roll, the assemblies having means to sequentially engage the roll upon turret indexing, introducing a first fluid into a first assembly and completing a first application run using the first fluid, translating the turret out of fluid transfer relation with the roll and indexing the turret to position a second assembly in alignment with the roll, translating the second assembly into fluid transfer relation with the roll and delivering a second fluid to the roll to develop a second application run. Prior publication EP-A-0 382 347 discloses a printing apparatus with a dual inking system embodying a doctor blade unit and a wipe roll unit which can be operated alternatively and wherein washing is performed on the inoperative unit.

According to the invention, the changeover time is substantially reduced by providing a plurality of fountain and doctor blade assembly positions on a common rotatable turret. Fluid may be routed through the doctor blade fountain or chamber as can cleansing fluid.

Other objects and advantages of the invention may be seen in the details in the ensuing specification.

BRIEF DESCRIPTION OF THE DRAWING:

The invention is described in conjunction with the accompanying drawing, in which --

FIG. 1 is a perspective view of a printing press according to the prior art co-owned Patent RE 30,819 which shows generally the field of application of the instant invention;

FIG. 2 is an enlarged side elevational view of the inventive turret as applied to a transfer roll;

FIG. 3 is a sectional view taken along line 3-3 of FIG. 2; and

FIG. 4 is another side elevational view featuring the translating and indexing means of the invention.

DETAILED DESCRIPTION:

Referring first to FIG. 1 which is captioned PRIOR ART, the designation F refers to a frame which consists of two side frames joined together by suitable cross members. The press as seen in FIG. 1 also includes a plate roll, an anilox roll and a fountain equipped with doctor blades. This is the general environment in which the invention operates.

Referring now to FIG. 2, the numeral 10 designates generally an anilox roll. More generally, this roll can be a wide variety of rolls which are employed for fluid transfer -- as in the application of adhesive as well as printing ink. For example, not only could the equipment be in the nature of a printing press but also could be a printer for tissue for rewinder lines, a tissue laminator, etc.

The numeral 11 designates generally the inventive turret which is an elongated member such as an extrusion having three fountains or chambers as at 12, 13 and 14. The elongated turret 11 has an axis of rotation or indexing 11a and, in the illustration given, the fountains 12-14 are equally spaced circumferentially or perimetrically about the axis 11a. A greater or lesser number of fountains (at least two) can be used to advantage depending upon the application and design features. Each fountain or chamber 12-14 is defined by an axially extending recess in the turret member 11. As illustrated, each fountain is further defined by doctor blades as at 15 and 16 relative to the fountain 12; blades 17 and 18 relative to the fountain 13 and blades 19 and 20 relative to the chamber or fountain 14. The free edges of each of the doctor blades are equally spaced radially or outwardly from the axis 11a. This insures that the doctor blades will properly engage the fluid transfer roll 10.

Conduit means generally designated 21 are provided in the turret member 11 for delivering fluid to the fountain 12 which is seen to be in transfer relationship with the anilox roll 10. As illustrated in FIG. 2, the conduit means 21 are shown coupled to the fountain 12 and there are return conduit means generally designated 22 which can be used for recycling or returning the fluid not taken up by the roll 10 -- see also FIG. 3.

A wide variety of delivery and return conduit means can be employed -- again depending upon the requirements or advantages of a particular installation. Very often, a very simple conduit system is employed which consists of flexible hoses coupled to ports which in turn communicate with the fountain recess. The conduit means illustrated are just one example and are seen to

include a stationary tubular member generally designated 23 which is positioned within a cored or otherwise-provided axially extending opening generally designated 24 in the turret member 11.

Referring specifically to the central portion of FIG. 2, it will be seen that the conduit means 21 includes a first part 21a which is stationary and a second part 21b which is indexable along with the turret 11. Thus, in the illustration given I provide the indexable conduits at positions 21b relative to the fountain 13 and again 21b relative to the fountain 14. It is believed that at this point, the invention can be better appreciated from a consideration of a typical operation of apparatus as seen in FIG. 2.

SUMMARY OF OPERATION

A typical printing and cleanup cycle would include two or three types of fluids:

Ink can be routed to the inlet conduit means 21 and returned to the ink reservoir via the return conduit means 22. Then, at the conclusion of a particular run (whether it be printing via ink, adhesive application, etc.), the ink is drained from the coupling hoses (not shown) and the fountain-doctor blade assembly. Thereafter, cleaning solvent is routed through the doctor blade chamber 12 in a manner similar to the ink flow. During this part of the cycle, the anilox roll can continue to rotate at a slow speed. Normally this is provided in presses of the nature involved by what is called "Sunday drive".

Several cleaning cycles may be used with varying solvents and/or possibly reversing the flow direction. A third fluid, such as compressed air, may finally be used to drive out the remaining solvents.

Once the cleaning cycle is complete the turret 11 is retracted away from the roll 10. This can be appreciated from a consideration of FIG. 4. In FIG. 4, the numeral 10 again indicates the position of the anilox or transfer roll and the numeral 11a designates the axis of rotation of the turret 11. The ends of the turret carry subframes 25 which slide in gibs or ways 26 provided on the same subframe that carries the anilox roll.

Connected to the subframe 25 is a retraction means 27 which may be in the nature of a pressure fluid cylinder, ball and screw arrangement, etc. and which operates to retract the turret 11 to the position 11b (see FIG. 2) which is sufficiently away from the anilox or transfer roll 10 so as to permit indexing of the turret 11 and the passage by the anilox roll 10 of the doctor blade holders 28 (FIG. 2). Once the turret 11 has been retracted, indexing, i.e., rotation, is performed so as to move the fountain 12 up to the position 13 designated in FIG. 2. This results in positioning fresh blades in the working position designated 12 in FIG. 1.

At this time, assuming the anilox roll 10 and associated plate roll, etc. are ready, the turret 11 can be brought forward so as to load the new blades against the anilox roll and new ink is circulated through the doctor blade chamber or fountain and a second run of printing can begin. With the used blades in the position of designated 13 in FIG. 2, the used blades may now be removed, the old doctor blade fountain chamber thoroughly cleaned and new blades installed.

In some instances, the invention can be used to advantage in changing a doctor blade only. For example, it is not uncommon to have a given run extend over two days, viz., six shifts. It is common in the printing trade to replace the doctor blades each shift and the instant invention provides for an efficient and time-saving way of doing this. In the past, the operator and an assistant had to be employed to manually lift out and switch the doctor blades or, in some cases, the doctor blade holders.

Referring again to FIG. 4, it will be noted that the turret 11 is seen in dashed line and the axis of rotation is again designated 11a. The indexing or rotation is achieved by virtue of a stepping motor 29 driving a pinion gear 30 in engagement with gear 31 provided coaxially with the turret 11. The stepping motor is programmed to index the turret 120° after which a locating, stabilizing pin 32 enters a slot 33 to restrain the turret against further rotational movement. It will be noted that the pins 32 are circumferentially spaced apart corresponding to the various fountains and enter into the slot 33 under the influence of the retraction unit 27.

Again, a variety of supply and return conduit means may be employed. By the same token, a variety of doctor blades and, for that matter end seals such as those shown at 34 and 35 of FIG. 3 may be employed.

Claims

1. A printing press comprising a frame (F), a fluid transfer roll (10) rotatably mounted on said frame, an elongated, multiple position turret (11) rotatably, translatably mounted on said frame and having an axis of rotation (11a) and positioned adjacent said roll, a plurality of circumferentially related fountain assemblies (12, 13, 14) on said turret, characterized in that each fountain (12, 13, 14) is equipped with two doctor blades (15-16, 17-18, 19-20, respectively) wherein the free edges of each doctor blade are equally spaced radially from said axis of rotation so as to engage said fluid transfer roll, conduit means (21) coupled to said turret for alternatively delivering coating and cleaning fluid to each fountain for transfer to and cleaning of said roll, first means (29-33) coupled between said frame and an end of said turret for indexing said turret about said axis, and second means (25-27) coupled between said frame and an end of said turret for translating said turret radially away from said roll.

2. The press of claim 1, characterized in that said turret is equipped with block-like subframes (25), said frame having gib means (26) adjacent each end of said turret, said block-like subframes riding in said

gib means, and said translating and indexing means being coupled to said block-like subframes.

3. A method of operating a printing press having a frame (F) rotatably supporting a fluid transfer roll (10), providing a turret (11) indexably, translatably mounted on said frame and having an indexing axis (11a) and which is provided with fountain assemblies for supplying fluid to said roll, and means for sequentially engaging said roll upon turret indexing, introducing a first fluid into a first assembly and completing a first application run using said first fluid, translating said turret out of fluid transfer relation with said roll and delivering a second fluid to said roll to develop a second application run, characterized by providing each fountain assembly (12, 13, 14) with two doctor blades (15-16, 17-18, 19-20, respectively) wherein the free edges of each doctor blade are equally spaced radially from said axis of rotation so as to engage the fluid transfer roll.

4. The method of claim 3, characterized in that, following the completion of said first application run, cleansing fluid is introduced into said first assembly.

5. The method of claim 4, characterized in that the first mentioned translating step is performed after said assembly and roll are cleansed.

6. The method of claim 4, characterized in that said cleansing fluid includes first a solvent and thereafter compressed air.

Patentansprüche

1. Druckerpresse mit einem Gestell (F), einer drehbar auf dem Gestell gelagerten Fluidtransferrolle (10), einem auf dem Gestell neben der Fluidtransferrolle dreh- und verschiebbar gelagerten langgestreckten Revolver (11) mit einer Drehachse (11a), der eine Vielzahl von Stellungen einnehmen kann, sowie einer Vielzahl von auf dem Revolver in Umfangsrichtung einander zugeordnet angeordneten Farbkasteneinrichtungen (12, 13, 14), **dadurch gekennzeichnet,** daß die Farbkästen (12, 13, 14) jeweils mit zwei Rakeln (15-16, 17-18 bzw. 19-20) ausgerüstet sind, wobei die freien Kanten der Rakeln jeweils im gleichen radialen Abstand von der Drehachse liegen, um sich an die Fluidtransferrolle anzulegen, daß an den Revolver eine Leitungsanordnung (21) angeschlossen ist, um jedem Farbkasten zur Weiterleitung an die bzw. zur Reinigung der Fluidtransferrolle abwechselnd Beschichtungs- und Reinigungsfluid zuzuführen, daß zwischen das Gestell und ein Ende des Revolvers eine erste Einrichtung (29-33) eingefügt ist, um den Revolver um die Achse schrittweise fortzuschalten, und daß zwischen das Gestell und ein Ende des Revolvers eine zweite Einrichtung (25-27) eingefügt ist, um den Revolver radial von der Fluidtransferrolle wegzuverschieben.

2. Druckerpresse nach Anspruch 1, **dadurch gekennzeichnet,** daß der Revolver mit blockartigen Untergestellen (25) ausgerüstet ist und das Gestell an jedem Ende des Revolvers Führungseinrichtungen (26) aufweist, wobei die blockartigen Untergestelle in den Führungseinrichtungen laufen und die Verschiebe- und die Schrittschalteinrichtungen mit den blockartigen Untergestellen verbunden sind.

3. Verfahren zum Betreiben einer Druckerpresse mit einem Gestell (F), auf dem eine Fluidtransferrolle (10) drehbar gelagert ist, bei dem man einen auf dem Gestell verschieb- und schrittweise fortschaltbar gelagerten Revolver mit einer Drehachse (11a) vorsieht, der mit Farbkasteneinrichtungen zur Zufuhr von Fluid zur Fluidtransferrolle sowie Einrichtungen zum sequentiellen Anlegen an die Fluidtransferrolle nach dem Fortschalten des Revolvers versehen ist, ein erstes Fluid in eine erste Farbkastenanordnung eingibt und mit diesem ersten Fluid einen ersten Auftragdurchlauf vollständig durchläuft, den Revolver aus der Fluidtransfer-Lagezuordnung zur Fluidtransferrolle herausnimmt und dieser Rolle ein zweites Fluid zuführt, um einen zweiten Auftragdurchlauf durchzuführen, **dadurch gekennzeichnet,** daß man die Farbkasteneinrichtungen (12, 13, 14) jeweils mit zwei Rakeln (15-16, 17-18 bzw. 19-20) versieht, wobei die freien Kanten der Rakeln jeweils im gleichen radialen Abstand von der Drehachse liegen, um sich an die Fluidtransferrolle anzulegen.

4. Verfahren nach Anspruch 3, **dadurch gekennzeichnet,** daß man nach Abschluß des ersten Auftragdurchlaufs ein Reinigungsfluid in die erste Farbkasteneinrichtung gibt.

5. Verfahren nach Anspruch 4, **dadurch gekennzeichnet,** daß man den ersterwähnten Verschiebeschritt nach dem Reinigen der Farbkasteneinrichtung und der Rolle durchführt.

6. Verfahren nach Anspruch 4, **dadurch gekennzeichnet,** daß das Reinigungsfluid erst ein Lösungsmittel und danach Druckluft ist.

Revendications

1. Presse d'impression comprenant un bâti (F), un cylindre (10) de transfert de fluide monté afin qu'il puisse tourner sur le bâti, une tourelle allongée (11) à plusieurs positions, montée afin qu'elle puisse se déplacer en rotation et en translation sur le bâti et ayant un axe de rotation (11a), la tourelle étant adjacente au cylindre, et plusieurs ensembles dis-

tributeurs (12, 13, 14) disposés circonférentiellement sur la tourelle, la presse étant caractérisée en ce que chaque distributeur (12, 13, 14) comporte deux lames de raclage (15-16, 17-18, 19-20 respectivement), les bords libres de chaque lame de raclage étant également espacés de l'axe de rotation en direction radiale afin qu'ils soient au contact du cylindre de transfert de fluide, un dispositif (21) à conduit couplé à la tourelle et destiné à distribuer en alternance un fluide de revêtement et un fluide de nettoyage à chaque distributeur afin que le fluide soit transféré au cylindre et que le cylindre soit nettoyé, un premier dispositif (29-33) couplé entre le châssis et une extrémité de la tourelle afin que la tourelle soit positionnée autour de l'axe, et un second dispositif (25-27) couplé entre le châssis et une extrémité de la tourelle afin que la tourelle puisse être déplacée radialement en translation à distance du cylindre.

2. Presse selon la revendication 1, caractérisée en ce que la tourelle est équipée de sous-châssis (25) à paliers, le châssis ayant un dispositif (26) à contre-clavette adjacent à chaque extrémité de la tourelle, les sous-châssis à paliers se déplaçant dans le dispositif à contre-clavette, et le dispositif de déplacement en translation et de positionnement étant couplé aux sous-châssis à paliers.

3. Procédé de commande d'une presse d'impression ayant un châssis (F) supportant un cylindre (10) de transfert de fluide afin qu'il puisse tourner, comprenant le montage d'une tourelle (11) afin qu'elle soit mobile en translation et puisse se positionner sur le châssis, et ayant un axe (11a) de positionnement, la tourelle ayant des ensembles distributeurs destinés à transmettre un fluide au cylindre et des dispositif destinés à venir successivement au contact du cylindre lors du positionnement de la tourelle, l'introduction d'un premier fluide dans un premier ensemble et l'exécution d'une première étape d'application avec le premier fluide, le déplacement en translation de la tourelle afin qu'elle ne soit plus en relation de transfert de fluide avec le cylindre, et la distribution de ce fluide au cylindre pour l'exécution d'une seconde étape d'application, le procédé étant caractérisé en ce que chaque ensemble distributeur (12, 13, 14) comporte deux lames de raclage (15-16, 17-18, 19-20 respectivement) telles que les bords libres de chaque lame de raclage sont également espacés de l'axe de rotation en direction radiale afin qu'ils soient au contact du cylindre de transfert de fluide.

4. Procédé selon la revendication 3, caractérisé en ce que, après la fin de la première étape d'application, un fluide de nettoyage est introduit dans le premier ensemble.

5. Procédé selon la revendication 4, caractérisé en ce que la première étape précitée de déplacement en translation est exécutée après nettoyage de l'ensemble et du cylindre.

6. Procédé selon la revendication 4, caractérisé en ce que le fluide de nettoyage comporte d'abord un solvant, puis de l'air comprimé.

FIG. 1
PRIOR ART

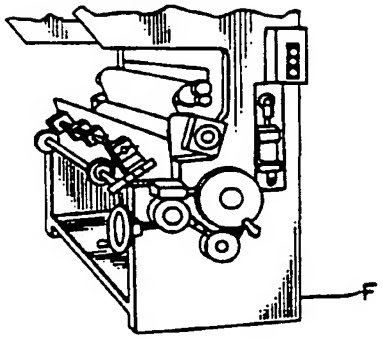

FIG. 2

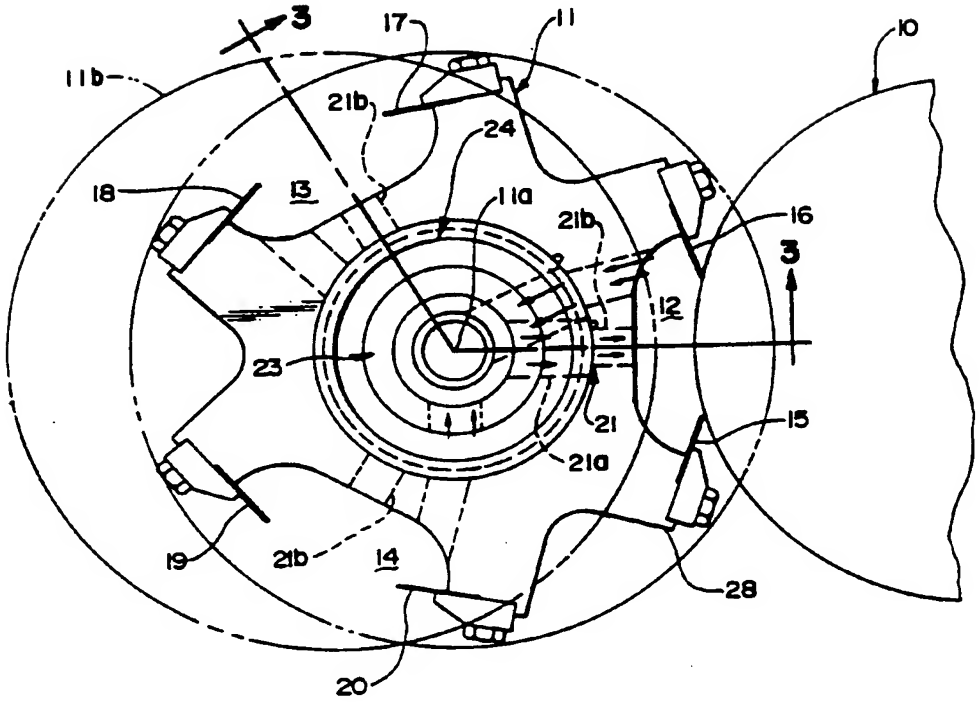

FIG. 3

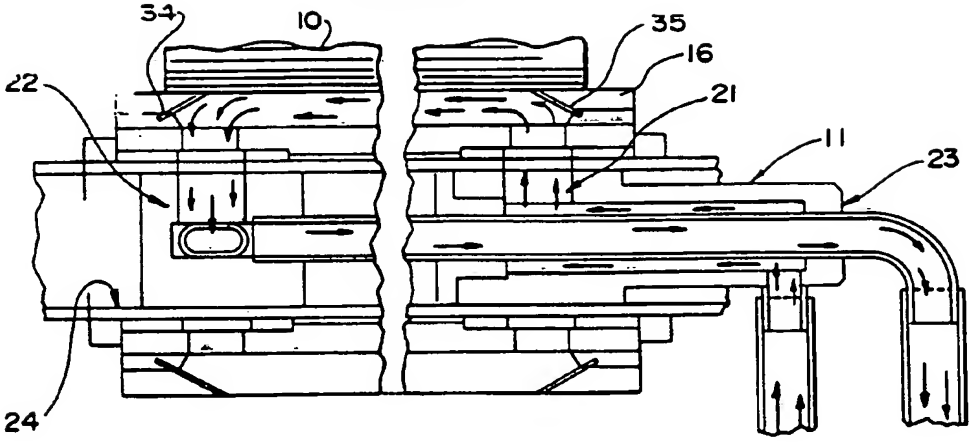

FIG. 4